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## ORIGINAL ARTICLE

### Psychometric properties of the sexual machismo scale (EMS-SEXISMO-12) in adults

*Propiedades psicométricas de la escala de machismo sexual (EMS-SEXISMO-12) en adultos*

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#### ABSTRACT

**Introduction:** Machismo is explained as the system of beliefs, attitudes and behaviors based on the polarization of the sexes and the superiority of the male gender. In the sexual sphere, it is the control that is exercised over a woman in relation to the expression of her sexuality under what is considered acceptable. Therefore, it is considered convenient to have instruments to measure this variable. **Objective:** The objective of this study was to determine the psychometric characteristics of the sexual machismo scale (Ems-sexismo-12) in adults. **Method:** The methodology used was of an applied nature, with a non-experimental approach and instrumental design, applying the instrument to a sample made up of 530 adults (M=308 and F=222) aged between 18 and 65 years, obtained through non-probabilistic sampling by quotas of the districts of Piura. The content validity, confirmatory factor analysis (WLSMV estimator), internal consistency and reliability of the scale were evaluated. **Results:** The results showed content validity in the items (Aiken's  $V > .70$ ). For its part, after the confirmatory factor analysis, a unidimensional structure was revealed with satisfactory goodness-of-fit indices (CFI = .96; TLI = .95; RMSEA = .08; SRMR = .06). Likewise, reliability is evidenced with acceptable values ( $\omega = .83$ ). **Conclusion:** The EMS-12 scale proved to be a valid and reliable instrument for adults.

**Keywords:** Sexism, Adults, psychometrics, validity, reliability.

#### RESUMEN

**Introducción:** El machismo se explica como el sistema de creencias, actitudes y comportamientos basados en la polarización de los sexos y la superioridad del género masculino. En la esfera sexual, es el control que se ejerce sobre una mujer en relación con la expresión de su sexualidad bajo lo que considera aceptable. Por ello, se considera conveniente disponer de instrumentos para medir esta variable. **Objetivo:** El objetivo de este estudio fue determinar las características psicométricas de la escala de machismo sexual (Ems-sexismo-12) en una muestra peruana. **Método:** La metodología utilizada fue de carácter aplicado, con un enfoque no experimental y diseño instrumental, aplicando el instrumento a una muestra conformada por 530 adultos (M=308 y V=222) con edades entre 18 y 65 años, obtenida mediante muestreo no probabilístico por cuotas de los distritos de Piura. Se evaluó la validez de contenido, análisis factorial confirmatorio (estimador WLSMV), la consistencia interna y la confiabilidad de la escala. **Resultados:** Los resultados mostraron validez de contenido en los ítems (V de Aiken  $> .70$ ). Por su parte, tras el análisis factorial confirmatorio se reveló una estructura unidimensional con índices de bondad de ajuste satisfactorios (CFI = .96; TLI = .95; RMSEA = .08; SRMR = .06).

Asimismo, la confiabilidad se evidenció con valores aceptables ( $\omega = .83$ ). **Conclusión:** La escala EMS-12 demostró ser un instrumento válido y confiable para adultos.

**Palabras claves:** Sexismo, Adultos, psicometría, validez, confiabilidad.

## INTRODUCTION

Machismo is understood as the conviction, attitudes and behaviors that are based on the polarization of the sexes or the radical distinction between the feminine and the masculine and the conviction in the superiority of the masculine in significant areas (Castañeda, 2019).

Sexual machismo is defined as the control of the man over a woman in relation to the expression of her sexuality under what he considers acceptable; It manifests itself through a lack of empathy, jealousy and even imposition during the sexual relations (Silva and Zavala, 2020). Some authors consider sexual machismo a manifestation of sexism that degrades women and is related to several factors that negatively affect the mental health (Mamani and Herrera, 2020).

Sexism can also be understood as a behavior that discriminates based on the erroneous belief about the inferiority of women in general (Cameron in Moya & Expósito, 2001). It occurs through jealous behaviors, lack of empathy with the partner and sexual submission regardless of the woman's desire (Silva and Zavala, 2020).

Glick and Fiske (1996) suggest that sexism is shown through two general concepts represented by favorable and unfavorable attitudes towards women. In this sense, unfavorable behaviors are considered hostile sexism, which encompasses the classic and traditional form of sexism characterized by antipathy and negative stereotypes towards women. Unlike benevolent sexism, which despite being guided by positive feelings, are still sexist attitudes that position women based on positive feelings such as protecting them and providing them with the role of mother and wife. Likewise, benevolent sexism could be used to cover up hostile sexism, however these may vary according to the context in which the subjects relate. This theory considers a model that constitutes hostile and benevolent sexism. These dimensions are classified into paternalism, which refers to the distribution of power, also the gender difference, and the last dimension that is related to sexuality when it focuses on lack or dangerous sexuality, placing the man himself in a risk situation. In our current reality, the United Nations Population Fund (UNFPA, 2020) in its report on the state of World Population announced that approximately 50% of women in developing countries do not see their right to decide if they want to maintain sexual relations with their partner, demonstrating how women lack autonomy and freedom to choose the use of a contraceptive method or seek medical attention.

On the other hand, the National Institute of Statistics (INEI, 2023) indicates that 55.7% of women suffered some type of violence perpetrated by their partner or romantic partner at some point in their lives. In Peru, sexist positions are supported, as shown by the survey carried out by the Institute of Peruvian Studies (IEP, 2023), which reflects that 37% of Peruvians consider it appropriate for women to ask their partner's permission to go out, and a 14% justify attacks by men.

The impact of machismo is not limited only to women since according to the Pan American Health Organization (PAHO, 2019) the mortality rate in men is related to masculinity behavior. dominant, which includes unprotected sexual practices, violent relationships that can culminate in homicides, substance use and other actions that put their health at risk. This is why the sexual behaviors of a sexist man represent a risk factor for women, since it is characterized by behaviors lacking responsibility, respect and consideration (Díaz et al., 2010). Added to this, the culture associated with sexist gender roles are factors associated with a greater risk of violence and HIV infection for women (Cianelli et al., 2013).

Given this reality, the authors of the EMS-Sexism-12 scale considered it pertinent to create a scale to evaluate beliefs and attitudes linked to machismo to identify risk levels associated with the practice or tolerance of it. This scale has research aimed at analysis and adaptation in international contexts, such as Álvarez and Noreña (2023), who carried out an analysis of the scale on machismo in a Colombian population; Camacho (2020) who conducted a study on a sample of students from northern Mexico. On the other hand, in Brazil López-Silva et al. (2020) conducted a study that sought to adapt a Scale on Sexual Machism within the Brazilian population and finally Herrera, et al. (2019) who analyzed psychometric properties of said scale using a Chilean and Peruvian sample.

For its part, there are some contributions from national research such as that of Huamani, et al (2023) who carried out a psychometric analysis in an Arequipa population. Likewise, in the city of Lima, Sánchez (2022) investigated the psychometric properties in the Lima population, as did Cajachagua and Díaz (2022), who used a sample of young university students from the same city. However, it is verified that despite the relevance of the topic, there are few documents that have studied this variable within our context, which is why the need arises to carry out an analysis on the validity of said instrument on sexual machismo in a sample from Piura. Therefore, the following question arises.

As described above, the present analysis mainly sought to determine psychometric characteristics of the sexual machismo scale (Ems-sexismo-12) in adults from the city of Piura, 2024. Likewise, specific purposes were sought such as obtaining evidence based on the content of the EMS scale, also finding evidence of the internal structure through confirmatory factor analysis of the EMS and finally reviewing the reliability of the scale.

## METHODS

### Design

This study adopted a non-experimental design, which implies that no stimulus or conditions other than their own are applied. Likewise, participants are evaluated in their natural environment without modifying the situations or the variable itself (Hernández-Sampieri & Mendoza, 2018). Likewise, this study is

considered instrumental or also known as psychometric, since within this typology it is considered the study that examines psychological evaluation instruments, whether they are new tests or to establish validation standards (Ato, 2013).

### Participants

The sample calculation was based on the general rule proposed by the APA where it recommends working with samples of at least 300 participants as a minimum sample (White, 2022). A non-probabilistic quota sampling was carried out, including 530 adults, women ( $n= 308$ ; 58.11%) and men ( $n= 222$ ; 41.89%), aged between 18 and 65 years, belonging to the 10 districts of the city of Piura. Adults with cognitive or literacy difficulties and those who did not consent to participation were excluded.

### Instruments

The scale used was EMS-Sexism-12, developed by the authors Cecilia Díaz, María Rosas and Mónica González in 2010 in Nuevo León-Mexico. The creation of the scale was with the purpose of evaluating sexist behaviors, identifying risks to sexual health and their levels of risk when tolerating sexism. This scale demonstrated adequate levels of reliability through Cronbach's alpha coefficient of 0.80. Furthermore, it showed adequate adjustment in CFI, GFI and TLI validity indices, since they were greater than 0.9, an RMSEA value less than .08 and a  $\chi^2/df$  ratio = 0.3 (Díaz et al., 2010).

### Procedure

Initially, a sample of 50 participants was taken for the purpose of a pilot test and to verify the understanding of the items previously evaluated through Aiken's V. Subsequently, we traveled to the city districts to access the participants in person. Likewise, questionnaires were applied virtually through Google forms, previously obtaining informed consent from each of the participants.

### Data analysis

A detailed examination was carried out, in which the relevant data were analyzed and interpreted (Sánchez, et al., 2018). The present study was subjected to the evaluation of seven judges specialized in the corresponding area using Aiken's V coefficient, which allows verifying the relevance of the items in relation to their content, based on the evaluations made by the experts which, the closer Let the value be 1, it is understood as greater content validity that will have greater content validity. (Ruiz and Cornejo, 2021)

The internal structure was evaluated through confirmatory factor analysis (CFA), which allows identifying factors and analyzing their relationship with each other (Segura, et al., 2014). In addition, indices that indicated the level of fit to the model were considered. Among them we find the square root of the mean of the squared residuals (SRMR), for which a value of 0.08 is recommended for samples greater than 100. Other relevant indices are the goodness of fit index (GFI), which suggests a value greater than or equal to 0.93 (Cho et al, 2020), the RMSEA index, whose value must be equal to or less than 0.05, the comparative fit index (CFI), which must be greater than or equal

to 0.95 (Lai, 2020), and the Tucker-Lewis index (TLI), which is suggested to be greater than 0.90 (Xia & Yang, 2019). Regarding incremental fit indices, such as the GFI, CFI and TLI, it is established that a score equal to or greater than 0.90 is considered adequate, while a score greater than or equal to 0.95 is considered optimal (Escobedo Portillo et al., 2016). On the other hand, there are authors who offer a more flexible perspective regarding the main fit indices used in the analysis of models, Whittaker and Schumacker (2022) argue that greater and equal scores consider scores greater than .90 for CFI. and TLI as appropriate; On the other hand, RMSEA and SRMR indices less than and equal to .80 are considered acceptable and those less than and equal to .05 are considered optimal.

### Ethical aspects

The research study presented is in accordance with the necessary permissions to use the instrument from compliance with the ethical foundations already established by the César Vallejo University (2022), which suggest respecting and maintaining honesty throughout the research, as well as respect for intellectual authorship and rights of researchers to avoid plagiarism. The protocol was approved by the Institutional Ethics Committee of the César Vallejo University. All participants were informed about the study and signed a consent form before participating.

Likewise, the corresponding permissions will be requested from the participants, respecting the guidelines recommended by the College of Psychologists of Peru (2018), thus ensuring that the present study does not entail unpleasant consequences or risks for the participants, and the protection of their rights throughout the entire process. In addition, data will be obtained through real processing respecting moral values and principles during the study.

### RESULTS

Table 1 presents the content validity of the EMS-Sexism-12 in adults, assessed using Aiken's V coefficient. Seven judges evaluated the items, determining all to be valid. The items demonstrated adequate sufficiency, clarity, and relevance. Aiken's V is a measure used to evaluate the relevance of items concerning their content based on the assessments of multiple judges. The coefficient ranges from 0 to 1, with values closer to 1 indicating higher content validity. These results confirm the robust content validity of the scale (Ruiz and Cornejo, 2021).

Figure 1 illustrates the confirmatory factor analysis (CFA) of the EMS-Sexism-12. The evaluation followed the goodness-of-fit criteria recommended by Whittaker and Schumacker (2022). According to their guidelines, a Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) greater than 0.90 are considered acceptable for evaluating model fit quality. Similarly, root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) values of  $\leq 0.08$  are deemed acceptable, with values  $\leq 0.05$  considered optimal.

The original model yielded the following fit indices:  $\chi^2/df = 6.5$ ,  $p < .001$ ; CFI = .94; TLI = .92; RMSEA = .107; SRMR = .07. These results indicated that the unidimensional model of the EMS did not fit the data adequately.

To address this, modification indices were analyzed, leading to the application of error covariances between items 1 and 3 (.28) and items 11 and 12 (.23). The revised model produced improved indices:  $\chi^2/df = 219.02/52$ ,  $p < .001$ ; CFI = .96; TLI = .95; RMSEA = .08; SRMR = .06. These results demonstrate that the unidimensional model of the EMS-Sexism-12 is a good fit for the adult sample from Piura, yielding significant findings.

**DISCUSSION**

The present research had machismo as a study variable, which is defined as the control exercised by a man over a woman in relation to the expression of their sexuality (Silva and Zavala, 2020). These types of attitudes and behaviors of superiority represent a latent risk due to their relationship with violence (Huamani et al., 2019) and the increase in this in recent years (INEI, 2022; INEI 2023; MIMP, 2024). Likewise, it affects the right to sexual freedom, decision-making and access to health, gen-

erating more inequality between genders (UNFPA, 2020). In our Peruvian context, it is important to validate a scale related to machismo according to the indicators of violence and the machista positions that justify it (IEP, 2023). That is why, under this premise, the present study analyzed the psychometric properties of the EMS -12 by the authors Díaz Rodríguez et al. (2010) in a Piura sample where both sexes were considered, given that machismo is a problem that is not limited only to women (PAHO, 2019).

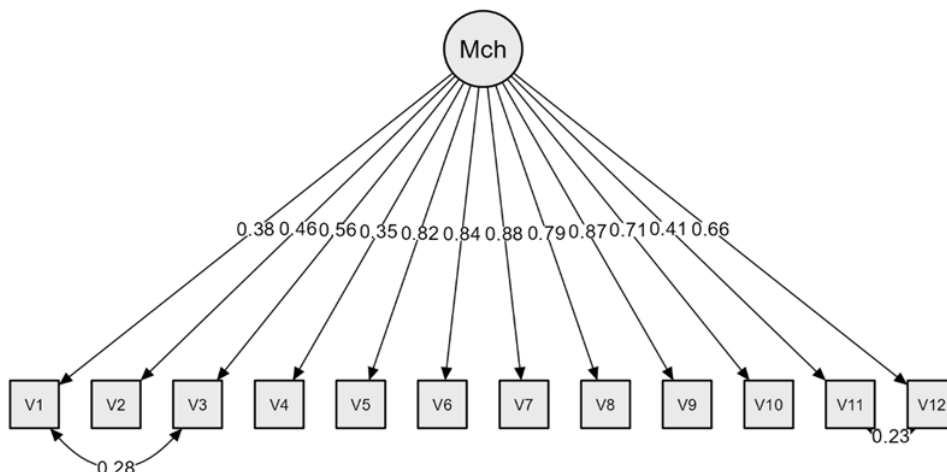
To achieve the research objectives, the scale was subjected to evaluation by a group of judges, the CFA and a reliability test. Based on the results obtained, it was evident that the instrument is suitable for application in Piura.

Likewise, it reflects a model that adjusts to the acceptable values of the different analyses. Which agrees with the study by Huamani et al. (2019) where the version of this unidimensional questionnaire is made up of 12 items that represent the sexual

**Table 1.** Validity indicators 95% CI for the scale items.

Items	Sufficiency		Clarity		Coherence		Relevance	
	IA	p	IA	p	IA	p	IA	p
1	1	0.01	1	0.01	1	0.01	1	0.01
2	1	0.01	1	0.01	1	0.01	1	0.01
3	1	0.01	1	0.01	1	0.01	1	0.01
4	1	0.01	1	0.01	1	0.01	1	0.01
5	1	0.01	1	0.01	1	0.01	1	0.01
6	1	0.01	1	0.01	1	0.01	1	0.01
7	1	0.01	1	0.01	1	0.01	1	0.01
8	1	0.01	1	0.01	1	0.01	1	0.01
9	1	0.01	1	0.01	1	0.01	1	0.01
10	1	0.01	1	0.01	1	0.01	1	0.01
11	1	0.01	1	0.01	1	0.01	1	0.01
12	1	0.01	0.86	0.01	1	0.01	1	0.01

Note. IA: Agreement Index



**Figure 1.** Confirmatory factor analysis with the DWLS method.

machismo variable that obtained similar validity and reliability values in a considerable sample of both sexes in the city of Arequipa, a context belonging to the Peruvian reality and differs from the study. In the same way, similar results were obtained to the study by Silva et al., (2020) since the authors validated the unidimensional scale with satisfactory adjustment indicators taking indicators such as CFI, RMSEA obtaining a scale suitable for the Brazilian population. At a specific level, we sought to obtain content validity of the EMS, through Aiken's V where the elements of the scale were subjected to expert judgment, where values from 0.86 and 1.00 were found. This means that the items are valid as suggested by Ruiz and Cornejo (2021), the values closest to 1 are understood as elements with greater content validity, coinciding with the study carried out by Cajachagua and Díaz (2022) where the scale was subjected to analysis by 7 expert judges who considered the reagents to be appropriate, which implies adequate sufficiency, clarity, relevance and coherence for application in the sample.

In the analysis of the validity of the internal structure through the CFA with the unidimensional model, modifications of residual covariances were made in items 1 "That only the man has sex before marriage" with Item 3 "That only the man has sexual experience" and Items 11 "The man must start his sexual life in adolescence and 12" "The man must make his son start his sexual life" obtaining a respecified model. This residual covariance process coincides with what was applied in the research of Herrera et al., (2020) where they considered correlating items 1 and 3, managing to improve the model fit indices in a Peruvian population, however, they were unable to confirm the model. This final model achieved adequate fit indices, reporting indicators of  $\chi^2(df) = 219.02(52)$ ,  $p = .001$ ; IFC = .96; TLI = .95; RMSEA = .08; SRMR = .06. Taking as reference the goodness-of-fit measures suggested by Whittaker and Schumacker (2022), who argue that scores greater than 0.90 for CFI and TLI are considered adequate to evaluate the quality of model fit. Likewise, the RMSEA index and SRMR that are less than or equal to 0.08 are considered acceptable. In turn, RMSEA and SRMR with values less than or equal to 0.05 are classified as optimal.

The results of this finding differ from what was reported by Herrera (2020) where, despite obtaining adequate validity indices, the original 12-item model was not confirmed after eliminating one of them. However, it coincides with the studies of Álvarez and Noreña (2023) in their research in the Colombian Caribbean with satisfactory goodness-of-fit indices; GFI=.98; CFI=.98; TLI=.97; RMSEA=0.08 and SRMR=.05. However, it differs from what was obtained in the research study by Silva et al. (2020) in which the goodness-of-fit indices are results.

Finally, the last objective was to establish the reliability of the instrument applied to adults in the city of Piura, using the Omega coefficient, obtaining from its only dimension a reliability score of .83 with a confidence interval of 95%; being highly favorable for exceeding levels greater than 0.8, this indicates that the scale is consistent over time and is within acceptable reliability indices.

The result of the present study is supported by the various investigations carried out previously that have shown that the EMS has acceptable reliability values (Álvarez and Noreña,

2023; Herrera et al., 2020; Huamani, et al., 2023). On the other hand, studies based on Cronbach's alpha coefficient were observed that obtained adequate reliability values (Camacho, 2020; López-Silva et al., 2020). By observing these results, it can be confirmed that this scale has stability in its results despite the time in which it was created in the different populations in which it has been applied, both young people and adults, as evidenced by studies carried out to date demonstrating that it has a level of reliability that is applicable in various Latin American populations.

### Strengths and limitations of the study

Despite showing adequate validity and reliability of the scale, it is necessary to consider some limitations, such as using non-probabilistic sampling due to its accessibility to the sample; Considering probability sampling could ensure a more representative sample, less risk of bias, and better generalization of results. On the other hand, it is also considered necessary to reduce the virtual application that may generate some biases in the responses; however, a large part of the sample were in-person applications; likewise, it would be ideal for these findings to complement each other. In our context with invariance analysis and with other sources of validity, such as, for example, evidence based on the relationship with other variables.

In clinical contexts, its application helps to identify problems related to sexist attitudes or gender violence. The validation of the scale provides an important basis that allows the design and implementation of prevention and intervention programs in vulnerable populations, promoting relationships based on mutual respect and reducing inequality gaps. Likewise, in social contexts, it is useful to raise awareness among the population about gender equality, prevent sexual violence and guide public policies.

### Conclusion

Based on the previously established objectives, it is determined that the psychometric properties of the sexual machismo scale have validity and reliability indices, so it is concluded that the sexual machismo scale is a valid and reliable instrument for its application in the Piura's population.

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### AUTHORS' CONTRIBUTION

Esther Gonzales Ortiz: Conception of the manuscript, data collection, statistical analysis, interpretation of the data, writing of the manuscript.

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### CONFLICT OF INTEREST

The author declare that he don't have conflict of interest.

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Not applicable.

## REVIEW PROCESS

This study has been reviewed by external peers in double-blind mode. The editor in charge was [David Villarreal-Zegarra](#). The review process is included as supplementary material 1.

## DATA AVAILABILITY STATEMENT

The authors attach the database as supplementary material 2.

## DECLARATION OF THE USE OF GENERATIVE ARTIFICIAL INTELLIGENCE

The author declares that he has not used tools generated by artificial intelligence to create paper, nor technological assistants for writing. The final version of the paper was reviewed and approved by the same author.

## DISCLAIMER

The author is responsible for all statements made in this article.

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